REMARKS

1.   In response to the Office Action mailed March 29, 2004 (PTO Prosecution Number 14), Applicants respectfully request reconsideration. Claims 42-69 were last presented for examination. All claims have been rejected in the current Office Action. No claims have been amended, cancelled or added in this paper. Thus, upon entry of this paper, claims 42-69 will remain pending in this application. Of these 28 claims, four (4) claims (claims 42, 57, 66 and 67) are independent.

2.   Bases on the following Remarks only, Applicants respectfully requests that all outstanding objections and rejections be reconsidered, and that they be withdrawn.

Art of Record

3.   Applicants acknowledges receipt of form PTO-892 (part of PTO Prosecution paper No. 14) listing additional references identified by the Examiner.

Claim Rejections Under 35 U.S.C. §103

4.   The Examiner has rejected claims 42-69 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,342,884 to Kamen, *et al.* (hereinafter, "Kamen") in view of U.S. Patent No. 6,700,588 to MacInnis, *et al.* (hereinafter, "MacInnis"). Specifically, the Examiner asserts that Kamen teaches Applicants' claimed graphic system comprising "a two-dimensional graphics imaging [pipeline] constructed and arranged to manipulate [two-dimensional (2D)] images." The Examiner refers Applicants to column 3, line 45-52 of Kamen in support of this assertion. The Examiner further asserts that Kamen also teaches "to composite separately generated three-dimensional (3D) images represented by pixel data comprising X,Y,Z coordinate and color data, wherein the X,Y coordinate data define horizontal and vertical dimensions of a pixel's display screen location, and wherein the Z coordinate defines an orthogonal distance from viewpoint to the image rendered at a pixel." The Examiner refers Applicants to column 4, lines 1-38 of Kamen in support of this assertion. The Examiner acknowledges that Kamen fails to teach a 2D graphics image pipeline as recited in Applicants' independent claims. Citing column

45, line 8-53 of MacInnis, the Examiner asserts that MacInnis teaches that such a 2D graphics pipeline is well-known in the art. (*See,* Office Action, page 2.)

5.   Based on the above interpretations of Kamen and MacInnis, the Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to configure Kamen's system as claimed because "Kamen's 2D graphics image system such as the 2D texture system ... can be implemented as a graphics 'pipeline' for enhancing the task of combining the 2D graphics data and the 3D object mesh structure. (*See,* Office Action, page 3.)

6.   Applicants respectfully traverse this rejection. First, Kamen does not teach implementing an imaging pipeline or compositing 3D images as suggested by the Examiner. Second, the art of record neither teaches nor suggests modifying Kamen's 3D graphics pipeline to implement a 2D imaging pipeline. Third, there is no teaching or suggestion in the art of record to composite separately-generated 3D images using a modified 2D imaging pipeline as recited in Applicants' independent claims. Based on these facts, Applicants respectfully assert that a *prima facia* case for obviousness has not been made by the Examiner, requiring withdrawal of the outstanding Section 103 rejections.

Kamen Neither Teaches Nor Suggests a 2D Imaging Pipeline as Claimed

7.   Kamen is directed to using a three-dimensional (3D) graphics pipeline for performing allegedly cost effective operations on two-dimensional (2D) images. Specifically, Kamen is directed to transforming 2D images into 3D space *using a 3D graphics pipeline*, and using the 3D pipeline to manipulate the 3D images. (*See,* Kamen, col. 1, lns. 1-6, 51-65.) As noted, the Examiner relies on the paragraph of Kamen at column 3, line 45-52 in support of this assertion. However, in the first line of that paragraph, Kamen states that "[i]n this example, **a 3D graphics pipeline** constructs a 3D image of an object from a 2D pixel array ..." (*See,* Kamen, col. 3, lns. 43-45; emphasis added.) This is consistent with the title given for the section of Kamen which includes the cited paragraph: "3D Graphics Pipelines" (*See,* Kamen, col. 3, ln. 1.) Thus, the Examiner's assertion that Kamen teaches Applicants' claimed graphic system comprising a two-dimensional graphics imaging is misplaced.

8.   This incorrect characterization of Kamen reveals a misunderstanding of what constitutes a 2D imaging pipeline - a misunderstanding Applicants believed was eliminated during prior prosecution, including interviews with the Examiner. Essentially, it appears this misunderstanding stems from the incorrect belief that any part of a graphics system that may store or process 2D data constitutes a 2D imaging pipeline. For example, referring to Figure 3 of Kamen, the Examiner observes that "Kamen's 2D graphics image system such as the 2D texture system ... can be implemented as a graphics "pipeline." A texture mapping subsystem is not a 2D graphics imaging pipeline but rather a portion of a 3D primitive-rendering pipeline. To equate a texture mapping subsystem with a 2D graphics imaging pipeline is inconsistent with the definition of a 2D graphics imaging pipeline which was discussed at length in prior Responses and touched on again below.

9.   Applicants' specification defines a "two-dimensional graphics imaging pipeline" as a graphics pipeline that processes pixel data having x and y coordinates and no z (depth) coordinate. This definition was discussed at length in the Responses filed July 18, 2002, December 9, 2002 and others since. In the first of such Responses, Applicants also provided excerpts of "Introduction to Volume Rendering" by Barthold Lichtenbelt, Randy Crane and Shaz Naqvi, Prentice Hall PTR, 1998 ("Lichtenbelt") describing different types of graphics pipelines and providing evidence that Applicants' definition of the term is consistent with that used by those of ordinary skill in the art. (*See*, July 8, 2002 Response, paras. 6, 7, 10; Attachment 1.)

10.   Furthermore, Applicants amended the independent claims in a prior Response to add language that the 2D images processed by the claimed two-dimensional graphics imaging pipeline are "represented by pixel data comprising color and X,Y coordinate date, and excluding Z coordinate data." Notably, in the above rejection based on Kamen, the Examiner omitted such additional recitations, stating that "Kamen teaches Applicants' claimed graphic system comprising "a two-dimensional graphics imaging constructed and arranged to manipulate images." This is not what is recited in Applicants' independent claims. Rather, the recited language is "... a two-dimensional graphics imaging pipeline constructed and arranged to manipulate two-dimensional (2D) images represented by pixel data comprising color and X,Y coordinate date, and excluding Z coordinate data ..." (*See*, Applicants' claim 42, above; emphasis identifying language omitted from the Examiner's rejection). This language, which was seemingly ignored by the Examiner, clearly

distinguishes Applicants' claimed two-dimensional graphics from a texture mapping subsystem of a three-dimensional graphics pipeline.

11.   It should be noted that a similar rejection was previously levied by the Examiner based on U.S. Patent 5,760,781 to Kauffman based on the observation that Kauffman's volume rendering pipeline stores 2D voxel data at one point in its voxel pipeline. Arguments similar to those above successfully traversed that rejection. Applicants believed that such prosecution also resulted in the Examiner understanding that a portion of a 3D pipeline which utilizes or stores 2D data (such as texture maps in Kamen or 2D voxels in Kauffman) cannot be implemented as a 2D imaging pipeline as claimed.

There is no motivation in the art of record to modify Kamen as proposed in the office action

12.   Applicants assert that there is no suggestion in the art of record to modify Kamen to utilize a two-dimensional graphics imaging pipeline as alleged by the Examiner. Kamen teaches transforming 2D images into 3D space so that a 3D graphics pipeline could be used to edit and/or manipulate the images without having to construct expensive and sophisticated dedicated hardware. (*See*, Kamen, col. 1, lns. 43-50.) Kamen teaches only such 2D-3D image transformations and processing the transformed 3D image using a conventional 3D graphics pipeline. Neither Kamen nor the other art of record provides the motivation to modify Kamen to convert the 3D graphics pipeline into a 2D imaging pipeline. In fact, doing so would prevent Kamen from achieving Kamen's stated objectives since conventional 2D graphics imaging pipelines process pixel data only and are incapable of manipulating 3D images.

13.   MacInnis teaches nothing more than a conventional 2D graphics imaging pipeline. The fact that 2D graphics imaging pipelines are well-known is of no consequence. What is of consequence is whether there is any teaching or suggestion in the art of record to modify a 2D graphics imaging pipeline to composite separately-generated 3D images as claimed. Such a teaching or suggestion cannot be found in MacInnis or the other art of record.

***There is No Teaching or Suggestion in the Art of Record to Composite
Separately-Generated 3D Images As Claimed***

14.   As noted, the Examiner also asserted that Kamen teaches "to composite separately generated three-dimensional (3D) images represented by pixel data comprising X,Y,Z coordinate and color data, wherein the X,Y coordinate data define horizontal and vertical dimensions of a pixel's display screen location, and wherein the Z coordinate defines an orthogonal distance from viewpoint to the image rendered at a pixel." This is incorrect. Kamen does not teach compositing images as alleged by the Examiner. In fact, there is no mention whatsoever in Kamen of compositing separately generated three-dimensional (3D) images as claimed. The portion of Kamen cited by the Examiner in support of this assertion is directed to the transformation of a 2D image into a 3D image, not to compositing images. In fact, Applicants assert that the art of record provides no teaching or suggestion whatsoever to composite separately-generated 3D images. In fact, the art of record is silent with regard to performing such operations or achieving such an objective.

15.   Thus, the Examiner has failed to provide any *evidence*, whether in the form of some teaching, suggestion, incentive or inference in Kamen, MacInnis or other art of record, or in the form of generally available knowledge, that one having ordinary skill in the art *would have been led* to modify the relevant teachings of Kamen in the proposed manner. This is because no such motivation exists in the applied references. Thus, the only conclusion that can be drawn, based on the record of this application, is that the suggestion forming the basis for the Examiner's otherwise factually unsupported conclusion must have come from Applicants' own novel disclosure; that is, they are based on impermissible hindsight. It is too well-settled for citation that an applicant's own novel disclosure cannot be used to supply the teaching or suggestion that is missing from the known art. Furthermore, for the reasons set out above, Applicants assert that even if one of ordinary skill at the time of the invention were motivated to modify Kamen as proposed by the Examiner, the resulting system would not contain nor would it have the advantages of Applicants' invention as recited in the independent claims. For at least these reasons, Applicants respectfully request that the rejection under Section 103 of the independent claims be reconsidered, and that they be withdrawn.

16.   Independent claims 57 and 66 are directed to a method for compositing three-dimensional images and a two-dimensional imaging pipeline which is configured to manipulate 2D images represented by pixel data. The pixel data comprises color and X, Y coordinate data and excludes Z coordinate data. The method claims recite operations nowhere taught, disclosed or suggested in the art of record. For example, in claim 57 there is no disclosure, teaching nor suggestion in the art of record of "processing in the 2D imaging pipeline Z coordinate data of a next 3D image to determine whether the stored or next 3D image is to be rendered at each pixel in a resulting composited image..." Similarly, independent claim 67 is directed to a graphic system comprising a two-dimensional imaging pipeline configured to manipulate two-dimensional (2D) images and to composite a separately-generated three-dimensional image stored in a frame buffer, and a next 3D image. There is no disclosure, teaching or suggestion to provide a two-dimensional imaging pipeline that comprises "a color data channel adapted to receive Z coordinate data and color data of a next 3D image" as claimed. For at least these reasons, Applicants respectfully assert that independent claims 57, 66 and 67 are patentable over the art of record.
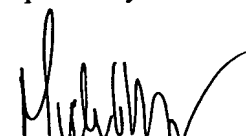
Dependent Claims

17.   The dependent claims incorporate all of the subject matter of their respective independent claims and add additional subject matter which makes them a fortiori and independently patentable over the art of record. Accordingly, Applicants respectfully request that the outstanding rejections of the dependent claims be reconsidered and withdrawn.

Conclusion

18.   In view of the foregoing, this application should be in condition for allowance. A notice to this effect is respectfully requested.

Respectfully submitted,

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